National Institute of Environmental Health Sciences

A differential effect of Indian ocean dipole and El Nino on cholera dynamics in Bangladesh

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Abstract:

BACKGROUND: A stationary (i.e., constant through time) association between El Nino Southern Oscillation (ENSO), the Indian Ocean Dipole (IOD) and epidemics of cholera in Bangladesh has been widely assumed. However, whether or not elements of the local climate that are relevant for cholera transmission have stationary signatures of the IOD on their dynamics over different time scales is still not clear. Here we report results on the time-varying relationships between the various remote and local environmental drivers and cholera incidence in Bangladesh. METHODOLOGY/PRINCIPAL FINDINGS: We performed a cross wavelet coherency analysis to examine patterns of association between monthly cholera cases in the hospitals in Dhaka and Matlab (1983-2008) and indices for both IOD and ENSO. Our results showed that the strength of both the IOD and ENSO associations with cholera hospitalizations changed across time scales during the study period. In Dhaka, 4-year long coherent cycles were observed between cholera and the index of IOD in 1988-1997. In Matlab, the effect of ENSO was more dominant while there was no evidence for an IOD effect on cholera hospitalizations. CONCLUSIONS/SIGNIFICANCE: Our results call for the consideration of non-stationary, possibly non-linear, patterns of association between cholera hospitalizations and climatic factors in cholera epidemic early warning systems.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3612031

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

El Nino Southern Oscillation, Extreme Weather Event

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: Other Asian Country

Other Asian Country: Bangladesh

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Foodborne/Waterborne Disease

Foodborne/Waterborne Disease: Cholera

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified